

**JOINTED PLAIN CONCRETE PAVEMENT****63-11.0100 INTRODUCTION**

Jointed Plain Concrete Pavement (JPC) has the advantages of having high strength and durability. However, without close supervision by qualified inspectors, these advantages can be greatly compromised. The Resident Engineer (RE) should assign sufficient, reliable, and knowledgeable inspectors to this operation and arrange his/her schedule to spend as much time as possible at the job site. In order to plan for the inspection needed and to avoid future problems after the project begins, the RE needs to become familiar with the plans, proposal, standard drawings, and specifications for this operation. Section 501 of the Standard Specifications addresses this type construction in detail.

**63-11.0200 MATERIAL REQUIREMENTS**

- .0210 General** - The RE is responsible for submitting all samples used in JPC construction to the District Materials Laboratory for testing and approval unless otherwise specifically directed. Therefore, the RE needs to be familiar with the requirements of the current Kentucky Standard Specifications for Road and Bridge Construction, The Division of Materials Sampling Manual, the Concrete Manual, the Construction Guidance Manual and the requirements of the plans and proposal. Files and records need to be accurately maintained so representatives of the Kentucky Transportation Cabinet or the FHWA can easily review them for any information that may be needed in connection with the contract. The RE needs to make certain that his/her files contain approved copies of test reports covering all materials used.

Sampling at the jobsite or concrete plant includes, but is not limited to, load transfer assemblies, longitudinal joint tie bars, transverse construction joint tie bars, sawed expansion and contraction joint materials, curing compound, air entraining agents, bond breakers, admixtures, cement samples, and mineral admixtures.

- .0220 Aggregates** - The fine and coarse aggregates should be furnished, stockpiled, and handled on the job or at the concrete plant so that uniformity of grading and free moisture content at the time of batching will be maintained. Watering/sprinkling of the stockpiles may be necessary for consistency and to keep the aggregate from pulling moisture needed for hydration away from the cement, particularly in hot weather and when new materials are added to the stockpile. The site on which stockpiles are to be placed should be firm, clean, and reasonably level, preferably consisting of DGA, or like material. Materials stockpiled at areas remote from

the plant site are to be used only when authorized by the RE.

At or about the time of the preconstruction conference, the RE should determine the Contractor's suppliers of the fine and coarse aggregates and notify the District Materials Engineer (DME). The RE should coordinate with the DME the responsibility of sampling and performing the gradation tests. The sampling procedure from various sources such as conveyor belts, flowing aggregates, stockpiles, trucks, barges, and railroad cars shall be done in accordance with the Materials Field Sampling Manual (MFS) 207. See Chapter 3, Section 63-03.1200, for information concerning the preconstruction conference.

The following points apply to the handling of all aggregates:

- a. The fine and coarse aggregates must meet the requirements of the specifications.
- b. The fine and coarse aggregates should be placed in separate stockpiles or bins to prevent materials at the edge of the stockpiles from being intermixed.
- c. Stockpiles should be built in layers not to exceed 3 feet in height and each layer should be completed before beginning the next layer.
- d. Aggregates should not be removed from the stockpiles within 1 foot of the ground until final clean up of the work.
- e. Materials which have become mixed with foreign matter or fine and coarse aggregates which have become intermixed shall be rejected.
- f. Aggregates should be handled in such a manner that the moisture content will be reasonably uniform for each concrete placement. Continually sprinkling/watering the stockpile may be necessary to accomplish this.
- g. Batching directly from a washing plant will not be permitted.
- h. All aggregates, where handled by hydraulic methods or where washing is involved, should be stockpiled or binned and allowed to drain at least 12 hours before being used.
- i. It is the responsibility of the RE, through project inspectors, to monitor the Contractor's handling of the aggregates to insure that no foreign matter is

included in the aggregate such as dirt, wood, coal, chert, etc.

- j. It is possible the Contractor may provide fresh mined coarse aggregates to the project. This aggregate may be absolutely dry as opposed to saturated, surface dry, which is the normal condition of most coarse aggregate. In this event, the RE should consult with the District Construction Office and the District Materials Engineer since the mix design must be modified and/or other actions taken to account for the super dry condition of the aggregate.

**.0230 Cement** - The RE should observe special precautions concerning cement:

- Cement, when stored, should be protected at all times from moisture.
- Cement should be handled in a manner to prevent loss, wetting, or contamination.
- When bulk cement is used, every precaution should be exercised to maintain a clean and clear cement feed to the cement batching bin so that the correct batch weight will be maintained at all times.
- Daily records of the cement shipments to the job batching plant should be furnished to the RE.
- The temperature of the cement at the time it is incorporated into the mixture should not exceed 170° F.
- Different brands of cement should not be mixed unless the area where the concrete is to be placed can be identified.

**.0240 Fly Ash** - Fly Ash is considered a cementitious material. It is used in place of cement as a cost reducer and can be used to increase workability, reduce permeability, and mitigate alkali silica reaction.

Fly ash can reduce early strength development and should not be used when high early strength is desired. The RE needs to be aware that the specifications impose limitations on the amount of fly ash that can be substituted for cement and that quantities should be monitored very closely as detailed in Section 601.03.03.C.2. Also, there are limitation as to the time of year in which fly ash may be used as per Section 601.03.09.D of the Standard Specifications.

The Division of Materials maintains a list of approved fly ash sources by power plant and distributor.

**.0250 Admixtures** - Admixtures may include air entraining agents, water reducers, and superplasticizers. Approval must be obtained on all chemicals prior to use in the concrete.

**.0260 Miscellaneous Paving Items** - JPC pavement may include reinforcing tie bars, load transfer assemblies, joint seal materials, expansion paper, etc. These items need to be approved by the Division of Materials as soon as they are delivered to the project and stored so that they are protected from mud and have limited exposure to damaging weather.

Any uncoated steel product will rust if left exposed. A light coat of rust should not affect the performance of the material, however, if the rust flakes off then proper cleaning of the steel needs to be made before it is used in the pavement.

**.0270 Curing Concrete** - The attention directed at mixing and placing the concrete in a manner to achieve the best possible pavement is wasted unless the concrete is cured properly. Curing concrete properly is critical for the concrete to achieve its strength and durability. Curing the concrete deserves the full attention of the RE and responsible inspector(s). It should never be taken lightly or assigned a minor role in the concrete inspection process. The primary methods of curing are White Membrane Curing, routinely referred to as Curing Compound, Wet Burlap, and Curing Blankets. All three methods are discussed in detail in Section 501.03.15 of the Standard Specifications.

Curing Compound is probably the method of choice for most contractors and will be addressed in some detail in this manual. When curing compound is delivered to the project, it should be stored in an accessible area and monitored to assure that the material is not damaged, contaminated or adversely effected by the weather. Curing compound should not be used if it has frozen and should be retested if exposed to freezing weather. It should be noted that curing compound has a limited shelf life and any expired material should be retested or removed from the jobsite.

Wet Burlap is generally used in those areas where Curing Compound is forbidden such as construction joints, exposed reinforcing steel, etc. If the contractor desires, the entire pavement can be cured with wet burlap. In any event, care must be exercised to ensure the burlap is kept wet for the entire curing period.

Curing Blankets are probably used less than either curing compound or wet burlap. They may, however, be used in conjunction with wet burlap, to help retain the moisture on the concrete. Curing blankets may, in fact, have a layer of burlap bonded to the underside to assist in retaining the moisture. Probably their most frequent use will be with some sort of insulation in periods of cold weather curing.

All curing methods need to be maintained and monitored for the entire duration of the curing requirement.

### **63-11.0300 CONCRETE PLANT**

- .0310 General** - The Contractor typically has the option of installing a concrete plant on the jobsite or obtaining concrete from a commercial producer. It is the responsibility of the RE to see that concrete is batched properly and delivered to the jobsite conforming to all the project requirements and specifications regardless of the plant location. This includes ensuring that proper inspection is made of the plant, the mix design being approved, and that all the samples of the concrete's ingredients are made according to the "Manual of Field Sampling and Testing Practices."

When Applicable, QC/QA Special Note 10E places the quality control responsibilities, i.e. establishing the mix design according the Concrete Manual, the control of the ingredients, the trip tickets, and records and test results at the plant, in the hands of the contractor. These responsibilities may be performed by the Department at the contractor's option when the quantity of concrete delivered to the jobsite is 250 CY or less.

- .0320 Initial Plant Inspection** - Before any concrete is batched to the project, the RE needs to check the plant for conformance to the requirements of the Division of Materials. This should include the observation of the plant operation to see that all conveyors, bins, scales, vents, gates, etc. are functioning properly. Especially note whether the scales have up to date testing and certification and that the scales go back to zero after the bins are emptied.
- .0330 Mix Design** – Standard Specification 601.03.2 requires the contractor to submit, for approval, the mix designs needed on the project when the quantity exceeds 250 CY.
- .0340 Batch Records** – Trip tickets TC 63-9 should be kept on a daily basis. Ensure the contractor keeps the following records on a daily basis:

1. Date of Pour
2. Number of batches produced for the project
3. Batch weights
4. Moisture test results
5. Size of a batch
6. Cubic yards of concrete produced for the project
7. Actual footage placed
8. Theoretical footage that item #4 should have placed
9. Difference between #5 and #6 expressed as a percent(%)
10. Cement used
11. Cement received
12. Fly ash received
13. Sand/Aggregate received
14. Theoretical cement on hand
15. Actual cement on hand
16. Difference between #10 and #11 expressed as a percent(%)
17. Sand used
18. Total sand used to date
19. Stone used
20. Total stone used to date
21. Time plant started
22. Time plant stopped
23. Hours of plant operation

**.0350 Testing** - In order to assure a consistent mix, especially at the start of the project, slump and air tests need to be performed on a regular basis. Ensure that the contractor runs moisture tests at least twice a day, beginning the first thing in the morning and when freshly delivered stockpile material is to be used, to control the mix according to the moisture in the fine and coarse aggregates. These tests should be performed as outlined in the "Kentucky Methods" manual. If the producer is performing these tests, then the RE should verify that these tests are being run.

#### **63-11.0400 PREPAVING**

**.0410 General** - Prior to beginning the paving on the project, the RE and assigned inspectors should familiarize themselves with all aspects of the project. This includes, but is not limited to, the maintenance of traffic, joint details, pavement design, Contractor's equipment and manpower, grades, cross sections, and other aspects listed in Section 501 of the Kentucky Standard Specifications. It is

recommended that a pre-paving meeting be held between the Department and Contractor personnel to discuss the contract requirements, proposed paving schedule, haul routes, batch plant and stockpile site locations, delivery access, target air content and slump, sampling procedures and locations, curing schedule, joint sawing methods, equipment and timing, joint layout, joint sealing, construction joint method, method of vibration and pouring sequence. This should help avoid problems that could cause delays in the project after the work begins.

**.0420 Plan Review** - The RE shall review the plans with emphasis on the following:

**.0421 Joint Details** - On large urban area projects, with many ramps and intersections, this is very important. Offset or small angled joints ( i.e. sharp triangles or points should be avoided) can cause undue cracking and affect the performance of the pavement. Doglegs or perpendicular joints are recommended to avoid cracking. Care should be taken to ensure that the joints are not locked up at these locations. Anticipate where the joints on the subsequent pour will be to avoid a point in a later phase; sometimes a dogleg will need to be formed into the next lane or formed into the lane you are pouring to avoid a point. Joints should always follow the lane lines unless not allowed by partial width construction. Traffic may perceive longitudinal joints in the pavement as lane lines as the striping fades. It should be noted that, unless required by the plans, all lanes should be dropped from the right with the joints following this plan.

**.0422 Maintenance of Traffic** - Unless the project is a completely new road or involving a road closed to traffic, maintenance of traffic will likely be a requirement. More than likely, the construction will be done in accordance with the direction of traffic flow. This will greatly affect the paving operation and partial width construction may be required. The RE should review the Traffic Control Plan and study the problems created by the traffic to determine the best way to construct the project. In some circumstances partial width construction may involve hand placement, so the RE should be prepared to discuss its use and the inherent problems with the Contractor.

**.0423 Hand Placements** - It is the intent of the specifications that, unless otherwise provided, the pavement is to be placed mechanically as outlined in the specifications. However, as field conditions merit, it may be necessary to hand place the PCC pavement in certain areas. These areas are to be held to a minimum and generally determined before work begins.

**.0424 Drainage** - The pavement needs to be reviewed for proper drainage, especially at intersections and areas where two separate roadways or ramps intersect.

**.0430 Contractors' Meeting** - A pre-pave meeting with the Contractor should help eliminate problems before they become critical after the work begins and cause delays on the project. The following should be discussed at this meeting:

- The Contractor's equipment and how it conforms to the requirements of Section 501 of the Standard Specifications.
- The equipment used to deliver the concrete to the jobsite. It should be noted that the time of discharge of concrete is different between truck mixers, i.e. agitating trucks, and dump trucks or paddle agitating "dump crete" type trucks. See Section 601.03.07 of the Standard Specifications for these times.
- The haul route from the concrete plant to the jobsite. It is especially important to discuss how the contractor plans to protect the newly placed concrete when necessary to haul over it.
- The number of employees the Contractor plans to use.
- The Contractor's responsibility for protecting the pavement due to weather conditions.
- Confirm that the Contractor's plan for hand placement of the pavement conforms to the plans and specifications.
- The Contractor's method of protecting unsealed joints and that they plan to keep the pavement free of debris that could cause damage to the pavement surface.
- The RE and the Contractor should establish a line of communication so that the project is not delayed because of misinformation or delays in acquiring approvals.
- Paving sequence
- Target air and slump



- Sampling procedures and locations
- Curing Schedule
- Joint sawing- conventional vs early entry (soft cut), timing, # of saws, accurate marking, depth, etc.
- Joint sealing- type, application, sampling
- Construction joints- header construction method
- Vibration equipment- montitors, handheld vibrating
- Tie-bars- installation method, size, epoxy
- Dowel bars
- Adding moisture to the concrete surface for finishing

**.0440 Employees** - The RE should determine the number of employees necessary to properly inspect the paving operation. Each inspector's responsibilities, as they pertain to work assignments, should be discussed and reviewed. The RE should establish a line of communication so any problem can be resolved quickly before they become critical.

**.0450 Documentation** - The RE should establish a procedure for proper documentation of the paving by using Daily Work Reports (DWR's), field books, and diaries. Efforts should be made to assure that each employee assigned to the paving project knows the proper method of documentation. This should minimize possible errors that could cause a delay in payment to the Contractor. It should be noted that when describing the pavement that has been placed during the day, the station numbers should be as accurate as possible. Also, when paving multilane roadways, the pavement lanes will be numbered from the median lanes out.

**.0451 The RE** - shall lay the groundwork for preparation of the Final Estimate as well as proper procedures for entering pay quantity data in the DWR's. *See Section 63-12.0500 in Chapter 12 of this manual.*

**.0452 Diaries** - All drawings and sketches should be made on the DWR or on cross-section paper and referenced by the DWR. Documenting beginning and ending stations, pavement width and offset is a minimum.

- .0460 Testing** - The RE should see that all the necessary tests and approvals are obtained on materials before paving begins. This includes, but is not limited to, the gradation tests on the aggregates and any tests needed on reinforcing steel, dowel bars, load transfer assemblies, cement, joint seal, curing compound, etc.

#### **63-11.0500 PAVING OPERATION**

- .0510 General** - There are several critical items during this phase of the project operation that need close supervision. Ensuring conformance to the plans and Specifications at this time should assure a high quality and durable pavement. Consult with the District Construction Office and, if necessary, the Central Office, Division of Construction for assistance and direction if there are any problems.

- .0511 Subgrade Preparation** - The subgrade is to be prepared as outlined in the plans and specifications and compacted to meet Specification requirements. The aggregate subgrade is to be fine graded by an approved mechanical means to the grade required by the plans. The grade can be checked by use of a level or a string line stretched between the grade stakes or “blue top” hubs. It is important that the subgrade be consistent and within the required tolerances, as this will affect the final smoothness or rideability of the pavement, and could shorten the expected life of the pavement. When forms are used, a planer will be used that will ride on the forms grading the base within the forms to provide a proper grade.

Review Chapter 9 of this manual for additional information and procedures pertaining to Subgrade and Base Construction.

- .0512 Placement of Load Transfer Assemblies, Tie Bars, and Forms** - It is very important that these items be placed securely and in their proper plan location for the pavement to function as designed. Load transfer assemblies need to be well staked and placed properly. Normally the dowels are parallel to the longitudinal grade line of the pavement. It is necessary to place reference stakes, nails, or other reference methods along the axis of the assembly on the outside of the proposed pavement to provide the proper line for the joint.

Tie bars can be tied in place by the use of approved stakes or placed in the pavement using mechanical or hand operated devices during the concrete placement operation. The RE should confirm that the method used places the steel tie bars at the proper height and location.

All of the tie bars are to be clean. If the pavement is adjacent to previously placed concrete and the tie bars have concrete on them, the Contractor must

use an approved method to clean them. A small amount of curing compound on the reinforcing steel is permissible per Standard Specification 501.03.15.A.

If forms are used, they shall be placed and anchored as outlined in Section 501 of the Standard Specifications. Two sided forms of the proper thickness dimension with a wide base are required. Straight (one sided) forms supported by pins or any forms of the wrong height supported by extra gravel to gain height are not acceptable. Damaged, bent, warped forms should be marked as such and removed from the project. Flexible forms should be used in sharp radii to provide a smooth curve. It should be noted that it is very important that the grade of the base be properly compacted and graded as to assure a consistent form grade. This, in turn, should greatly improve the rideability and longevity of the pavement. The grade should be compacted first and the forms installed on the grade; material should not be filled and compacted within the forms after they are set except for minor final grade check adjustments.

**.0513 Drainage Blanket** - In many cases, superior performance of the pavement can be achieved by providing the ability to drain water from underneath the slab. If a drainage blanket is used to accomplish this, it is important that the RE check the grade and thickness of this layer. The RE should also see that the perforated pipe drains are constructed to plan grade and elevation to assure free draining of the layer. *See Section 63-09.0300 in Chapter 9 of this manual for additional information concerning Drainage Blankets.*

**.0514 Weather Limitations** - Before paving begins, the RE shall determine if the temperature and weather will be appropriate for paving. If weather conditions are such that they will adversely affect paving, the Contractor should delay his operations until the weather becomes acceptable.

At all times, the Contractor should have readily available, sufficient plastic sheeting to cover and protect the unhardened concrete pavement in case of rain. If rain does damage the pavement, the Contractor must submit, for approval, a proposed method of correcting the problem. In this situation, concrete pavement is not normally considered eligible for payment until satisfactory corrective measures are implemented.

**.0520 Slip Form Paving** - It is very important that the Contractor use accurate control measures to ensure that concrete is placed to the proper grade and alignment. With this type of paving, a string line or other accurate control measures need to be securely fastened to allow the paver's electronic sensors to function properly. It is critical that the paths supporting the paver's tracks be properly compacted, free of all debris, and stable. This is necessary to achieve good pavement

rideability.

The following are special points that need to be considered during this operation:

1. The RE should review and document the Contractor's paving equipment. A thorough check should be made to ensure the proper equipment is furnished and that it meets the requirements of Section 501 of the Standard Specifications.
2. The concrete should normally be placed by means of a conveyor, chute, spreader or other approved device in front of the paver. Augers or other non-segregating devices may be used to distribute the concrete evenly along the width of the paver; however, the concrete should never be moved by vibration. It should be noted that concrete improperly spread in front of the paver may cause the paver to "ride" upon the pile of concrete thereby causing an uneven pavement.
3. To get an even, consistent slab, a paver needs to be continuously moving. The RE should work with the Contractor to see that the delivery of the concrete is timed to assure this.
4. Special care is to be taken to see that the paver forms the applicable edges and curbs smoothly, consistently, and without any excessive edge slump as specified by Section 501.03.19 of the Standard Specifications. A 10-foot straightedge is required in making this determination. If unsatisfactory results are being obtained, the Contractor is to be informed immediately and must make the necessary adjustments to the paver or concrete mix to correct this problem.
5. The reinforcing bars, whether drilled and epoxied tie-bars or tie-bar baskets must be placed at the proper locations shown in the standard drawings or plans. It should be noted that the longitudinal tie bars should not cross the pavement transverse contraction or expansion joints. They must be kept a safe distance from the joint to avoid breaking the corners. If the bar spacing causes this to happen, the Contractor shall use an approved means to see that the pavement is properly "tied" at these locations.
6. Depth checks should be randomly made to ensure the slab is being constructed at the proper thickness.
7. Behind the paver, a 10-foot straightedge should be used to help eliminate any uneven areas. It is not the intent to use this straight edge as a

finishing float. If the pavement slab requires an extreme amount of handwork behind the paver, the Contractor shall immediately adjust the paver or concrete mix.

8. The burlap drag is to be kept damp but not too wet that it causes an undue amount of water on the concrete slab.
9. No water is ever to be sprayed directly on the uncured slab. Under extremely dry or windy conditions, if it becomes necessary to add moisture to the surface, an approved fogging device should be used. Do not allow pump sprayer nozzles to be removed for more water. The addition of water is to replace the water from the mix lost to evaporation.
10. It is important to monitor the random transverse grooving. It is the intent that pavement texturing be done with a mechanical device at random spacing. If this becomes impractical, hand grooving may be acceptable if satisfactory results are obtained. Ensure grooving conforms to Standard Specification 501.03.13.H. Ensure that the grooving (tining) machine provides proper depth grooving but also that it does not break or damage the pavement edges in any way.
11. Check the vibrator monitor to verify that the vibrators are working properly and that the frequency is within an acceptable range ( 8000-11,000 rpm).
12. Visually check the mat for proper consolidation, proper line, grade, slope, etc. continuously through the pour. If immediate corrections cannot be made consider whether the operation should cease until the problems are resolved.

**.0530 Formed Pavement** - Formed PCC paving is similar to slip form paving except that the paver or mechanical screeds/rollers rides on fixed forms. It is very important that the forms are clean, properly treated with a bond breaker, and pinned so they are stable. The tops of the forms must be clean and smooth and no rocking or shifting of the forms will be permitted.

**.0540 Hand Placing** - It is the intent of the specifications that a paving “train” performs all PCC paving using approved pavers, etc. However, there are many cases where it is impractical or impossible to use the equipment outlined in Section 501 of the Standard Specifications. Examples of this are small block out sections needed to maintain the existing traffic or isolated areas that have variable pavement widths. Hand placing of the concrete may be the only practical way to construct the pavement in these circumstances. When hand placing the concrete pavement, the

following should be noted:

1. All control of mixes, delivery, etc. shall be applicable.
2. Forms shall conform to all the requirements of Section 501 of the Standard Specifications.
3. Care should be taken to ensure that the subgrade, aggregate bases, and drainage blankets (if applicable) are graded to the required elevation and tolerances in the small and irregular areas.
4. The concrete should be placed in the forms by chute or other approved means so that a minimum amount of manipulation is needed. Under no circumstances should the concrete be moved by vibration.
5. Sufficient vibrators need to be available to assure consistent consolidation of the concrete.
6. Walking in the concrete should be discouraged, however if necessary, it should be kept at a minimum and any "footprints" should be repaired by the finishers by properly removing the void left by the footprint.
7. A screed device is necessary and may be a mechanical roller (Clary type), vibrating straight edge, or a rigid straight edge. The screed shall be at least 2 feet longer than the width of the formed area. Screed shall be straight and true; no warped rollers or bent screeds.
8. A 10-foot straightedge shall be available to assure a consistent grade.
9. No water should be sprayed on the concrete surface except by an approved fogging device.
10. All requirements of a burlap drag and transverse grooving shall be closely followed.

**.0550 Station Numbering** - Station numbers shall be cast into the pavement as per the requirements of the Standard Specifications. See Standard Drawing RPX-001(applicable version) and Section 501.03.13.I of the Standard .Specifications.

**.0560 Curing** - The RE should calculate the total amount of curing compound needed to be applied to the newly placed pavement. The quantity being used should be checked at random intervals to assure that the proper amount of compound is being applied. If forms are used, curing compound should be applied to the sides

as soon as the forms are removed. The application is to be applied within the required specified time period.

- .0561 Cold Weather** - An important aspect of curing is maintaining the concrete at the proper temperature as required by the specifications, particularly when cold weather is anticipated. Before paving begins, the Contractor should propose the method he plans to use if the air temperature becomes low enough to adversely affect the new pavement. This method should be approved and adhered to whenever the predicted temperature is to be in this range. Materials and supplies necessary to implement these procedures should be readily available and at the work site before proceeding to place concrete when cold weather is a possibility.
- .0562 Curbs** - In the event it is necessary to cast curbs separate from the PCC pavement, care should be used to keep curing compound clear of the location of the construction joint and reinforcing steel. This area is normally cured with wet burlap. Any curing compound sprayed in these areas must be removed completely before construction of curbs.
- .0570 Testing** - Slump and Air Tests are to be taken at the specified times as listed in the Division of Materials Field Sampling and Testing Manual. A passing slump and air test must be obtained from the first concrete delivered to the project before any concrete may be placed. After this, the concrete placing operation should not be stopped unless a failing test occurs. In the event of a failing test, the placement operation should be delayed until a passing test is obtained. Cylinder test specimens of the concrete should be made at the proper intervals. If it is critical to open the pavement to traffic as soon as possible, sufficient additional sample cylinders should be made to provide information relative to the concrete's early strength. In critical situations, it may be desirable to request a high early strength concrete mix. The cylinders should be cured as required by the Specifications.
- .0580 Documentation** - The following documentation is important.
- Trip Tickets should be filled out accurately. As slump and air tests are made, the test results should be written on the applicable ticket.
  - Slump and air test reports should show all tests that are made during the placement. It is very important that if a failing test occurs, the test reports show the results of an approved test that allows the concrete placement to continue.
  - The Daily Work Report should contain all information concerning the paving operation. This includes all equipment the contractor has and



is required to have. The accurate location of the pavement placed and an accurate measurement for pay of this should be clearly documented.

Show all calculations for pay quantities. The DWR should also record the weather, temperature, and any other environmental item that may affect the pavement. Also, the amount of concrete delivered to the jobsite and any delays that occur regardless of what caused them, should be documented. See Section 11.0450 in this chapter for additional information on DWRs.

- The RE Diary should record any events that may affect the paving.
- It is helpful to establish a paving field book to keep a reference of when each area of the pavement has been placed. This is especially helpful when there is a discrepancy between the pay record and the Contractor's records.

#### **63-11.0600 POST PAVING PROCEDURES**

**.0610 Straightedging** – If no ride quality requirement is specified The RE should straightedge the pavement as required in Section 501.03.19.B of the Standard Specifications as soon as practical. The Contractor should make the necessary corrections as required by diamond grinding or removal and replacement of the slab.

**.0620 Joints** - Joints should be sawed as soon as possible to control the pavement cracking. See Section 501.03.17 of the Standard Specifications and the Roadway Pavement Section of the Standard Drawings (RPN & RPS series). These joints should be sawed at locations required as outlined in the specifications. The Contractor should install an approved temporary seal to protect the sawed joint from debris. It should be noted that care of the sawed joints is the Contractor's responsibility and if the method chosen is not satisfactory, measures should be taken to see that this requirement is enforced.

**.0630 Pavement Smoothness Testing (Ride Quality)** - The necessary pavement smoothness testing with either a profilograph or profiler is to be performed according to the plans and specifications as soon as practical. The RE should request this testing, through the District Construction Office, to the Central Office, Division of Construction. Arrangements should be made several days ahead of time to allow for scheduling of the test and coordination with the Contractor. See Section 501.03.19 of the Standard Specifications.

**.0640 Pavement Maintenance** - Pavement Maintenance is very important during construction. Construction traffic should not be allowed on the pavement unless



necessary. The Contractor should take whatever measures necessary to see that the pavement is kept clean, especially when construction equipment will have to use the newly constructed slab. This includes continually sweeping of the pavement and any protective overlay to protect the slab from off road equipment that must “ride” on the new slab and any necessary temporary joint seals. Note that legal load limits are applicable to any construction equipment running on the new pavement.

**.0650 Sawed Joints** - Joints should be resawed to the proper width and depth according to the method of sealing required and thoroughly cleaned. The required method of sealing should be applied. If the concrete is damaged in the area of the sawed joint, the concrete should be repaired by an approved method before the final joint seals are made.

**.0651 Sealing Joints** - When neoprene seals are used, the transverse joint seals should not be cut but must be continuous across the entire pavement. Cutting may be permitted only when maintenance of traffic dictates partial width construction but this should be reviewed closely by the RE. Such cutting should be kept at an absolute minimum. In addition, any locations where the neoprene seal must be cut, including longitudinal joints, will require an adhesive lubricant-hot seal. Refer to section 501.03.18 for all sealing requirements.

**.0660 Correcting Damage of Cracking** - If damage is done to the pavement or uncontrolled cracking occurs on the slab, the Contractor should submit, for approval, a method for correcting this problem before the pavement is opened to traffic. If this is impractical, then the correction measures should be performed as soon as possible with proper control of traffic.

### **63-11.0700 OPENING TO TRAFFIC**

Section 501.03.20 of the Kentucky Standard Specifications outlines the requirements for opening the pavement to traffic. This is very important since it involves the safety and welfare of the public.

The following are important items to consider.

- The pavement should be thoroughly cleaned and sealed.
- All required signing and striping should be installed according to the plans, specifications, and the MUTCD including possible detour signing.
- All guard rail, barrier walls, crash cushions, and other safety devices are to ~~should~~ be

installed as per the plans including either temporary or permanent striping and pavement markers. Exceptions can be made as dictated by the Maintenance of Traffic Plan.

- All signals need to be installed and functioning properly.
- The Contractor should remove any equipment, stockpiles, additional paving devices, etc. to a clear distance from the roadway.